

True Translation of PCT/EP2004/008335 as filed on July 26, 2004

1703 1492US

## DISPOSABLE DIAPER WITH A GIRDLE

### Description

The invention concerns a disposable diaper, in particular for incontinent care, having a hip belt closed about a hip opening of the diaper and extending in peripheral direction which can be opened and closed at at least one location and with a main diaper portion having a front region, a rear region and an intermediate crotch region as well as a back sheet layer which is impermeable to liquids and which faces away from the body, and with a top sheet layer which is permeable to liquids and faces the body as well as an absorption body for body fluids, wherein the main diaper portion can be attached in a detachable fashion to the hip belt at its longitudinal end of the front region or of its rear region by means of first closing elements in such a fashion that a user, with the hip belt attached, can raise the main diaper portion between the legs and attach the free longitudinal end of the main diaper portion to the hip belt in a detachable fashion.

Disposable diapers of this kind have been disclosed many times in prior art. They have the advantage of allowing the user to initially apply the hip belt about the hips that usually conventionally closes in the stomach region. The diaper portion, whose rear region is normally attached to the belt of the disposable diaper, then hangs loosely in the downward direction. After the hip belt is closed, the user grasps the freely hanging end of the main diaper portion and guides the end from the rear between the legs in the forward direction to attach the free longitudinal edge to the

hip belt at an inward or outward location and in a detachable manner using the first closing means provided therefor. Clearly, the disposable diaper can also be applied in such a fashion that, after application and closing of the hip belt, the free downwardly hanging main diaper portion can be guided from the front region towards the rear region between the legs of the user and attached, in a detachable fashion, to the rear region of the hip belt. In some conventional disposable diapers, the main diaper portion can be completely detached from the hip belt to allow great flexibility with respect to handling of the disposable diaper, in particular for users in need of intense nursing care as well as immobile users.

Departing therefrom, it is the purpose of the present invention to further expand the ranges of application of a disposable diaper of this kind.

This purpose is achieved in accordance with the invention with a disposable diaper of the above mentioned kind in that, in addition to the main diaper portion and the first closing elements disposed between the hip belt and the longitudinal end thereof, additional longitudinally extending second closing elements are provided which facilitate, in particular, detachable connection between the hip belt and the front region of the main diaper portion and which are disposed in such a fashion that the user, after loosening the first closing element, can fold or flap open the front region of the main diaper portion away from the hip belt.

The invention therefore proposes a disposable diaper, in particular for incontinent adult care and for use by incontinent adults, with which the user or the nursing personnel can open the disposable diaper for purposes of inspection. Towards this end, the second closing means preferentially

remain in place. Only the first closing means are opened between the main diaper portion and the hip belt and the main diaper portion is then folded or flapped open away from the hip belt for visual inspection of the interior of the diaper. One can thereby determine whether or not the diaper is in need of changing or can be further used for the retention of fluids or solid body discharges. Towards this end, it has turned out to be particularly advantageous when the diaper must only be partially opened through release of the first closing means but otherwise remains on the body in the appropriate position for use. By means of the supporting function effected by the second closing elements, the disposable diaper remains in the chosen optimal position. Inspection of the diaper is therefore very rapid and can be carried out without inconvenience to the user.

The diaper in accordance with the invention also offers an additional advantage, since it must not only be used as a proper incontinence article rather, if appropriate, can also preferentially be used by male users as an undergarment with which the forward region can be partially opened while the disposable diaper otherwise remains seated on the closed hip belt, to allow the user to urinate. The user thereby folds over the main diaper portion sufficiently far from the hip belt such that, in the otherwise applied state of the diaper with the second closing elements in place, urination is possible without wetting the diaper. This feature has turned out to be particularly useful for disposable diapers in accordance with the invention used by individuals with only partially impaired urination control who normally sense the urge to urinate and can accordingly search for an appropriate toilet facility. In this case, the user, with the hip belt applied, can loosen the first closing element to then fold or flap open the front

region of the main diaper portion away from the hip belt so that, in particular for males, the user can urinate outwardly in the usual fashion, without the disposable diaper being wet by body fluids.

This possible use of the disposable diaper is extremely important with respect to the psychology of the user. The user thereby loses the sense of having to use a typical incontinent article, even if this is partially or substantially the case. In particular, communication between the patient and nursing care personnel is improved and acceptance of the inventive incontinence article increased.

The terminology "longitudinally extending second closing element" defines a preferential strip or band-shape for the second closing element, with which the width is not necessarily exceedingly narrow, although the greatest possible handling flexibility should be guaranteed. The second closing element advantageously has a length of between 10 to 50 cm, in particular between 10 to 40 cm and most particularly between 15 and 35 cm. In certain cases, e.g. for use in disposable diapers for particularly corpulent individuals, they can even be longer. The width of the second closing element transverse to the longitudinal extent advantageously lies between 0.5 and 8 cm, wherein a region of 0.5 to 6 cm, in particular up to 5 cm, in particular up to 4 cm and preferentially up to 3 cm is preferred.

Two such longitudinally extended second closing elements are preferentially provided which extend from the sides of the hips towards a lower portion of the front region facing away from the belt or even into the crotch region of the user. The front region of the main diaper portion of the disposable diaper can be detached from the hip belt and folded

away or folded over between the two sideward closing means in a forward direction, in a lower direction or even in an inward direction, but in any event away from the hip belt. The second closing means, in the applied state of the diaper, advantageously thereby have an approximately V-shaped extension with respect to each other. They must, however, not necessarily cross in the region of their ends. The angle with respect to a longitudinal middle axis of the disposable diaper can advantageously lie between 5 and 60 degrees, in particular between 5 and 50 degrees and most particularly between 10 and 50 degrees. Clearly, two separate, longitudinally extending closing means are not absolutely necessary. It would also be conceivable and even advantageous in certain applications, configurations and uses in the event that the two closing elements are formed from a single V-shaped or curved element.

The second closing means can be manufactured from a substantially non-elastic material or can include such a material. In this event, in the configuration of the disposable diaper in accordance with the invention, one should take care during proper use of the disposable diaper that the second closing means remain closed and attached in a direction towards the crotch of the user on the main diaper portion in such a manner that the main diaper portion can be sufficiently folded away from the hip belt to permit inspection or viewing and/or such that the user can urinate in the manner described above. In contrast thereto, it has turned out to be extremely advantageous in the event that the second closing means are stretchable and preferentially elastically stretchable. In this event, the second closing means are not necessarily displaced further in the downward direction i.e. in the direction of the crotch region of the main diaper portion rather, with a suitable configuration of the closing means,

can also be stretched during folding over of the front region of the main diaper portion for purposes of urination.

Designation of the second closing means as "stretchable" means that their initial length in the unstretched state can be increased by at least 10 % and preferentially by at least 50 % through introduction of corresponding tensile forces. The term "elastic stretchability " describes a stretchable material which returns to its original length after removal of the stretching forces. "Elastic stretchability" defines a situation in which the material is stretched to at least 130 %, preferentially to at least 150 % of its original length and can reset the increase in length by at least 50 % and preferentially immediately and certainly within about 3 minutes. Expressing this situation in terms of numbers, a material having a 10 cm initial length can be stretched to 15 cm initial length and return to a length of at most 12.5 cm.

When the first closing means are opened, the second closing means maintain the diaper on the body of the user in the proper position even if the disposable diaper or its absorption body has absorbed or contains significant amounts of fluid which attempt to draw the main diaper portion of the diaper in a downward direction. Independent thereof, the longitudinally extended second closing means support a precise positioning of the diaper on the body of the user. The second closing means can, in particular, be applied in such a fashion that they exercise a pre-tension on the neighboring main diaper portion of the disposable diaper and urge same into close seating on the body, without causing uncomfortable cutting. In particular, for the case of mobile users with otherwise relatively little physical impairments and with a healthy mental

state, the second closing means can also serve for occasional use, which leads to significant psychological advantages.

As mentioned above, the longitudinally extended second closing means can, in particular, comprise two strips or band-shaped closing means having two oppositely lying free ends. In accordance with an embodiment of the invention, each free end of the closing means is permanently attached to the hip belt during proper use. The other opposite lying end is free and, when applying the diaper to the body, is preferentially attached to the outer side of the main diaper portion, preferentially in the lower front region or in the crotch region of the main diaper portion and in a detachable fashion. In accordance with another embodiment, the longitudinally extended second closing means can be permanently attached to the main diaper portion, in particular to the front region or the crotch region of the main diaper portion during proper use, and the detachable holding connection is fashioned in the region of its opposite end to cooperate for attachment to and release from the hip belt.

In a further embodiment, both ends the second closing means are attached, preferentially in a permanent fashion, to the hip belt and to the main diaper portion and have a detachable closable connection along their longitudinal extent. This connection can be, for example, a previously adjustable buckle, a buckle whose position along a longitudinal extent can be adjusted, a gluing connection, or a mechanically acting closing element.

Both the first as well as the second closing elements can comprise conventional mechanically closing elements, in particular hooks or loops of

material, but also gluing regions. Gluing and mechanically acting closing elements are conventional and well known in the art so that a detailed description thereof is not necessary. One would simply like to mention that the first closing means, the second closing means, as well as the opposing closing elements on the main diaper portion or on the hip belt which cooperate therewith are disposed in such a fashion that the user can decide where to effect the holding connection and with which adjustable tension the holding connection should be formed. Moreover, it is also possible to close the first and or the second closing means by means of pre-positioned closing elements or opposing element regions on the main diaper portion or on the hip belt. In this manner, the user can effect as correct a positioning of the closing means as possible. In this case, an elastic stretching configuration of the material, in particular of the closing materials, has turned out to be advantageous to accommodate different body sizes and shapes of the user.

In accordance with a particularly preferred embodiment of the present invention, the second closing means, when presented to the consumer in particular in a packaged state prior to use, are folded onto each other in a pleated manner.

In accordance with an additional advantageous configuration of the invention, the second closing means, when presented to the consumer in particular in a packaged state prior to use, extend along the hip belt. They can thereby be attached at one end to the hip belt, wherein the second closing means thereby constitute an augmentation of the hip belt or can be integral therewith. For example, the hip belt can have a separation location in the peripheral direction at which the second closing elements



can be formed as a longitudinally extending band-shaped section of the hip belt. In a particularly advantageous improvement of this concept in accordance with the invention, the second closing means formed by the section of the hip belt can be disposed on the hip belt via intended breaking locations.

In accordance with another configuration of the invention, the second closing means, when presented to the consumer in particular in a packaged state prior to use, are disposed on the liquid impermeable layer. In this case as well, the second closing means can be configured thereon in an arbitrary fashion and in a detachable manner.

A still further configuration of the invention proposes that the second closing means, when presented to the user, in particular in the packaged state prior to use, are associated with the hip belt or with the main diaper portion in such a fashion that they can be left in this configuration and not used, without interfering with diaper usage. They can also be contained in a package which is separate from the hip belt and from the main diaper portion, in particular, if a disposable diaper in accordance with the invention is only to be used as a pure incontinence article or if, within a certain nursing care situation, one desires rapid application or removable of the hygiene article, in particular, by the user himself. The configuration or association of a second closing means as described has thereby turned out to be advantageous.

In an improvement of this concept in accordance with the invention, the closing means are configured on the hip belt or the main diaper portion in such a fashion that, upon presentation to the user in particular in a

packaged state prior to use, they are covered. This can be effected through overlap by additional covering elements, or covering layers. Pocket-like receptacles can also be provided at appropriate locations of the hip belt or of the main diaper portion or a second closing means, in particular ones which are folded in a pleat like fashion onto themselves, can be held or covered with a removable tape strip.

In accordance with an additional independently inventive concept, which can be used with a disposable diaper of the above mentioned kind, the sections of the hip belt that extend transverse to the main diaper portion can be folded in a pleated fashion (Z-shaped) onto themselves and/or in the direction towards the middle axis of the disposable diaper. In a further configuration of this concept which is inventive in and of its own right, the sections of the hip belt which extend on both sides away from the main body portion can be folded onto each other in an overlapping portion towards the longitudinal middle axis of the diaper, when presented to the consumer in particular in a package stated prior to use. Towards this end; the free ends preferentially extend in the outward direction, away from the longitudinal axis of the diaper so that the user of the diaper can easily grasp them such that the hip belt unfolds upon grasping.

In a further configuration of this concept in accordance with the invention, the hip belt is made from a single material section that extends in a peripheral direction. In another configuration of the concept in accordance with the invention, the hip belt is preferentially made from a single piece and folded in such a fashion in the inward direction onto the main diaper portion that one fold of one belt section penetrates into a fold of another belt section.

Further features, details and advantages on the invention can be extracted from the associated claims and the representation in the figures as well as the subsequent description of preferred embodiments of the disposable diaper in accordance with the invention.

**Fig. 1** shows the disposable diaper in accordance with the invention in the applied state;

**Fig. 2** shows a plan view of the disposable diaper of Fig. 1 in the flat state;

**Fig. 3** shows a plan view corresponding to Fig. 2 of a further embodiment of the disposable diaper in accordance with the invention;

**Fig. 4** shows a schematic view of a further embodiment of a disposable diaper in accordance with the invention in the applied state;

**Fig. 5** shows a plan view of the disposable diaper in accordance with Fig. 4 in the flat state;

**Fig. 5b** shows a plan view corresponding to Fig. 5 of a disposable diaper having associated second closing means;

**Fig. 6** shows a schematic representation for folding the hip belt;

Fig. 7 shows a schematic view of a further disposable diaper in accordance with the invention in the applied state; and

Fig. 8 shows a schematic representation of a further embodiment of a disposable diaper in accordance with the invention in the applied state.

Figures 1 and 2 show a first embodiment of a disposable diaper 2 in accordance with the invention in the applied and in the flat states. The disposable diaper includes a hip belt 4 and a main diaper portion 6 which is attached thereto in a detachable or permanent fashion and having a front region 8, a crotch region 10, and a rear region 12, wherein the rear region 12 overlaps the hip belt 4 and is preferentially permanently attached to the hip belt 4 at that location. Fig. 2 shows a layer 14 that is liquid impermeable and which is disposed on a side facing away from the body i.e. on the back sheet of the disposable diaper. In addition to the back sheet, the main diaper portion 6 includes an absorption body (not shown) and a top sheet that is permeable to liquid, which faces the body (not shown), and which is either made from a layer of the absorption body or from a separate, top sheet layer.

The hip belt 4 has sufficient length in a transverse direction of the disposable diaper such that (as shown schematically in Fig. 1) it can be closed onto itself about the entire hip of a user to form a peripherally closed hip opening. Towards this end, the hip belt includes closing tabs 16 or other arbitrary closing elements that can function in a glued or mechanical fashion. In accordance with a preferred embodiment, conventional mechanical closing elements in the form of hook and loop

materials can be used. In a preferred embodiment, the closing elements include a textile or textile-like outer and/or inner layer, in particular, a fleece (non-woven), which forms the loop material. This outer and/or inner side can serve as an interaction region for a component having hooks and disposed on the free ends of the hip belt 4.

First closing means 20, in the form of closing lashes or tabs, are provided on the free longitudinal ends 18 of the front region 8 of the main diaper portion 6 at both the left and right sides. These closing elements also have arbitrary conventional closing elements. Mechanical closing elements are preferred, in particular in the form of hook-building components of a hook and loop material, in which case, the outer side 22 of the hip belt 4 has components that constitute the loop materials, at least in the interaction region. Clearly, the first closing elements 20 must not be provided in the form of protruding closing tabs. It is also conceivable as well as advantageous in the event that the longitudinal ends 18 in the front region 8 are provided with closing elements on their inner or outer sides in the cross hatched regions 24 or continuously so that the main diaper portion can be internally or externally attached to the hip belt 4 in a detachable fashion.

The figures also show elongated strip or band-shaped second closing means 26 which extend, in the representation according to Fig. 2, as the hip belt 4, in the peripheral direction, transverse to the longitudinal middle axis 27 of the disposable diaper 2. In the embodiment shown, the second longitudinally extending closing means 26 are attached to the hip belt 4 in a detachable or preferentially permanent fashion at one end 28 approximately in the region of the side edge 30 of the main diaper portion

6. In the example shown, their width 32 is less than the width 34 of the hip belt 4 and they extend in a peripheral direction beyond the free ends of the hip belt 4. It would also be conceivable for the second closing means 26 to end, in the peripheral direction, before the free ends of the hip belt. On their ends 36 disposed opposite to the ends 28, the second closing means 26 have arbitrary conventional mechanical or glue closing elements 38 which, in the case shown, are in the form of protruding tabs.

Fig. 3 shows a plan view, corresponding to Fig. 2, of an additional embodiment of a disposable diaper in accordance with the invention. In this disposable diaper, the second closing elements 26 are positioned in the middle on the hip belt 4. Their attached ends 28 are disposed inside of the main diaper portion and their free ends 36 are attached to the hip belt 4 in a detachable fashion by means of arbitrary closing elements 38.

Fig. 1 shows the disposable diaper 2 in accordance with the invention in the applied state. The diaper is usually applied in such a fashion that a user initially directs the hip belt 4 about his hips so that it forms a closed loop, and then closes the hip belt in the stomach region using the closing elements 16 provided therefor. The user then takes the main diaper portion 6, which is hanging freely over his bottom, and grasps between the legs in a forward direction to dispose the free longitudinal end 18 of the front region 8 of the main diaper portion 16 inwardly or outwardly on the hip belt 4 and thereby close the disposable diaper by means of the above described first closing elements 20. This corresponds to the primary closing function of the disposable diaper. In this state, the disposable diaper 2 is particularly useful for incontinent care. It would also be conceivable if the longitudinally extended second closing elements 26

remain unused in their configuration seen in Fig. 2, remaining on the hip belt. In contrast thereto, Fig. 1 shows the second closing elements 26 in an activated closing function. The free ends 36 of both closing elements 26 are attached in a detachable fashion to the outer side of the disposable diaper 2 in the lower portion of the front region 8 or in the crotch region 10. In this fashion, a user can adjust an arbitrary tension when closing the second closing elements 26 to thereby achieve an additional support function for the main diaper portion 6 of the disposable diaper. In the example shown in Fig. 1, the second closing elements 26 extend in the applied state sideward from the hip of the user at an angle between 30 to 50 degrees relative to the longitudinal central axis 27 and in the inward direction. They therefore travel in a substantially V-shaped manner. This permits the user to open the first closing means 20 to thereby free the front region 8 of the main diaper portion 6 from the hip belt 4 and to move it away the hip belt in an inward or outward direction, in a folded or flapped manner. In the event that the second longitudinally extended closing elements 26 are configured in an elastic fashion, they may be stretched during the course of the above action. This new application of the disposable diaper in accordance with the invention allows the user to urinate without having the disposable diaper exposed to fluid. Subsequent thereto, the user can once more attach the main diaper portion 6 to the hip belt 4, as described above.

The embodiments according to Figs. 4 and 5 show configurations of the second closing means 26 on the outer side of the layer 14 (back sheet) which is liquid impermeable and which faces away from the body. They are disposed to extend in the direction of the longitudinal middle axis 27. Towards this end, the longitudinal extended second closing elements 26

are attached at one end 28 to the crotch region 10, in a detachable or permanent fashion. Their other free end 36 is attached in a detachable fashion by arbitrary closing elements 38. It is, however, noted that the second closing element 26 of the disposable diaper can also be provided as a separate piece. In this case, the back sheet of the main diaper portion, as for example shown in Fig. 5b, can have arbitrary, in particular, mechanical or glued complimentary closing elements disposed in the region designated with reference symbol 70 which cooperate with corresponding closing elements 38 of the second closing means 26 to effect a holding engagement. It is also conceivable and advantageous in the event that the overall outer side of the back sheet is created in such a fashion that it can engage in holding connection with the closing elements 38 of the second closing means 26. In this case, it would be advantageous in the event that the preferred engagement areas 70 for the closing elements 38 of the second closing means 26 are visually indicated on the back sheet in order to simplify positioning by the user of the second closing elements.

Fig. 4 shows the disposable diaper in the applied state. One notices the applied ends 28 in the crotch region and the free ends 36 attached to the hip belt 4 in a detachable fashion.

Fig. 6 schematically shows a preferred folding of the hip belt 4 on the main diaper portion 6 as seen in the direction of arrow VI in the representation of Fig. 5. (In Fig. 5, the hip belt is shown in the unfolded state). The hip belt 4 is made from a single piece material section. It includes a hip belt section 40 protruding from one side and a hip belt section 42 that protrudes from the other side. The hip belt section 40 is



initially folded in the inward direction about an axis 44 parallel to the longitudinal middle axis in the region of a longitudinal side edge 46 of the main diaper portion 6. The section 40 is then folded onto itself about a second folding axis and in the outer direction. As an independently inventive concept, the position of a second folding axis 48 in the transverse direction 50 is disposed such that a free end section 52 of the hip belt 4 can be easily grasped by the user in a manual fashion in a vicinity of the longitudinal side edge 46 of the main diaper portion. The free end 52 can thereby be disposed slightly outside of the longitudinal side edge 46 or slightly inward from the longitudinal side edge 46 (not shown).

The other section 42 of the hip belt 4 is likewise folded about a first folding axis 54 and about a second folding axis 56. Towards this end, the position of the second folding axis 56 in a transverse direction 50 is preferentially chosen in such a fashion that, as previously described in connection with the free end 52 of the first section 40, the free end 58 of a second section 42 seats in a easily grasped fashion and in the vicinity of the other longitudinal side edge 60. The folded sections 40, 42 overlap each other over a region 61.

The top sheet 62 and the back sheet 64 are also shown in Fig. 6. The hip belt is folded on the outer side of the disposable diaper.

Fig. 7 shows a further embodiment of a disposable diaper in accordance with the invention, wherein the second closing element 26 is configured as a single elastically stretchable band that extends in the peripheral direction. As can be seen in Fig. 7, this band can be disposed in the

direction towards the crotch region of the disposable diaper 6 to thereby form a V-shaped detachable connection.

In accordance with the further embodiment of Fig. 8, the second closing elements 26 are permanently attached to the main diaper portion or to the hip belt 4 in particular on both ends 28 and 36. However, they have a detachable connection 66 disposed approximately in the middle section. The closing elements 26 can be separated at this location and can be attached to each other in a detachable fashion using conventional closing elements, possibly through hooks or hooks and eyelet configurations.